FOREST PEST MANAGEMENT
Pacific Southwest Region 81 2593

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Report No. 81-2

3430 Evaluation
January 20, 1981

PSW FOREST AND RANGE EXPERIMENT STATION
AUG 27 1981
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ANNOSUS ROOT DISEASE: CRYSTAL LAKE RECREATION AREA, ANGELES NATIONAL FOREST

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ABSTRACT

The Crystal Lake Campground and Deer Flats Group Campground in the Crystal Lake Recreation Area, Mt. Baldy Ranger District, were surveyed for annosus root disease in order to present management alternatives for the disease which could be programmmed into the vegetative management plan for the Area. Vegetative cover was predominantly Jeffrey pine, with white fir as an additional stand component at higher elevations. Eight annosus centers in the Crystal Lake Campground and one in the Deer Flats Group Campground were located and mapped. The biology of Fomes annosus and practices and measures designed to reduce the impact of the disease are discussed.

INTRODUCTION

Part of the Crystal Lake Campground on the Mt. Baldy Ranger District was surveyed for Fomes annosus by the Forest Pest Management Staff on November 14, 1980, during a post-suppression evaluation of the dwarf mistletoe control project in the Crystal Lake Recreation Area (reported in 3430 memorandum of 12/4/80). On December 5, John Kliejunas, Gregg DeNitto and John Pierce of FPM completed the annosus survey of the campground and, in addition, surveyed the Deer Flats Group Campground for the root disease.

The objective of this evaluation was to present management alternatives for annosus root disease which could be programed into the vegetative management plan for the Recreation Area. An evaluation for other insect and disease problems in the two areas was done in 1977 (5200 memorandum of January 20, 1978).

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OBSERVATIONS

Crystal Lake Campground

Vegetative cover consists of mature ponderosa pines in the overstory with an understory of predominantly Jeffrey pine. Occasional bigcone Douglas-fir, sugar pine and incense-cedar are present. Canyon live oak occurs throughout the campground and is the major cover in some areas such as the lower and middle Chipmunk units. Exotic conifers have been planted in certain areas.

Eight annosus root disease centers were located in the campground (see attached map). Confirmation was based on the presence of F. annosus conks within stumps or incubation of collected wood samples in the laboratory. Seven centers were found on November 14 and noted in the 3430 biological evaluation dated December 4, 1980; the eighth center was found on December 5. Their locations are as follows:

Center No. 1: Fawnskin Picnic Area, north of the amphitheater. An open area with numerous old as well as recent pine stumps, indicating that the center is active and enlarging. Conks were present in four stumps.

Center No. 2: At site 82. Conks were present in two pine stumps. The area to the west (vicinity of sites 84-86) is open with stumps present, but F. annosus was not found.

Center No. 3: The clearing behind sites 71 and 72. Five pine stumps were present and conks were found in one. Planted knobcone (Monterey?) pines at the margin of the opening appeared healthy.

Center No. 4: Vicinity of sites 52, 53, and 54. Conks were found in three pine stumps at site 54. The disease center probably extends south to site 52. Planted incense-cedars across the road at site 53 appeared unaffected.

Center No. 5: At site 231. Conks were found in one of five pine stumps present.

Center No. 6: On the hill south of the main parking lot. Both old and recent pine stumps were present. Conks were found in two old stumps.

Center No. 7: At site 210. Conks were not found in pine stumps scattered throughout the middle Chipmunk area, but resin-soaked wood taken from the roots of a pine stump at site 210 was infected.

Center No. 8: At site 199. Conks were found in one pine stump.

Armillaria mellea was found in pine stumps adjacent to oaks 1) south of site 84, 2) at annosus center No. 4 in the Robin area, 3) at site 95, and 4) at site 170. The fungus was also found on one bigcone Douglas-fir stump at site 176.

Deer Flats Group Campground

This campground is at a higher elevation than Crystal Lake, with white fir as an additional stand component. Both F. annosus and A. mellea were found at the entrance to the campground (see attached map). Conks of F. annosus were present in one Jeffrey pine stump. A recently dead bigcone Douglas-fir tree and numerous stumps were present in the vicinity. Armillaria mellea, but not F. annosus, was found in three pine stumps in the vicinity of site 1. Numerous stumps were present on the hillside across the road and trees had been recently cut. Armillaria mellea, but not F. annosus, was found on two bigcone Douglas-fir stumps on the hillside.

The biology of Armillaria mellea and management options available for the root disease were discussed in the post-suppression evaluation report of December 4 (3430 memorandum). The biology of F. annosus and management options available for the disease follow.

BIOLOGY OF FOMES ANNOSUS

Fomes annosus is a fungus that attacks a wide range of woody plants, causing a decay of the roots and lower bole and death of sapwood and cambium. All conifer species in California are susceptible to the fungus. Hardwood species are rarely damaged or killed. In some instances madrone (Arbutus menziesii), and a few brush species, including manzanita (Arctostaphylos spp.), and sagebrush (Artemisia tridentata), are attacked.

During favorable periods, the fungus forms fruiting bodies in decayed stumps, under the bark of dead trees, or in the duff at the root collar. The fungus becomes established in freshly cut stumps from air-borne spores produced by the conks, and then grows into the root system. The fungus subsequently spreads to healthy roots of surrounding susceptible tree species via root contacts. Local spread of the fungus outward from a stump typically results in the formation of disease centers, with dead trees in the center and fading trees on the margin. These centers usually continue to enlarge until they reach barriers such as openings or groups of non-susceptible plants.

The fungus may remain alive for as long as 50 years as a saprophyte in infected roots and stumps. Young susceptible tree species often become infected and die after their roots contact old infected root systems in the soil.

MANAGEMENT OPTIONS

Once annosus root disease is established in a stand, no direct control is available. Control, therefore, involves prevention of new centers by decreasing the risk of stump infection, and silvicultural manipulation of infected stands to minimize the effects of the disease. Control practices and measures designed to reduce the impact of this disease are:

1. Prevent stump infection. Application of granular borax to freshly cut conifer stumps is effective in preventing most (90%) new infections. The chemical is toxic to the spores of F. annosus, but has no effect on existing infections. Borax application is required on all coniferous stumps cut in and near developed recreation sites (FSM R-5 Supp. 2305 and 2331.33). Application requires the prior submission of a Pesticide Use Proposal.

2. Species conversion. Revegetation of active annosus centers should be done only with resistant species. All conifers are susceptible to the fungus but hardwoods are rarely infected. Leaving the centers barren or planting them with resistant hardwoods will result in the fungus eventually dying out so that conifers can again be regenerated. Unfortunately, this may take up to 50 or more years. Favoring the hardwoods already present and planting other suitable hardwoods will provide shade and screening, as well as establish a barrier of non-susceptible roots which may limit the spread of the infection centers. Although F. annosus was present in the Lower and Middle Chipmunk areas, its affects there will probably be negligible because the numerous oaks in the area are providing a barrier of non-susceptible roots and maintaining desired screening.

In mixed conifer stands with infected true firs, conversion to pines may reduce subsequent infection. Root transmission of F. annosus from true fir to pine seldom occurs.

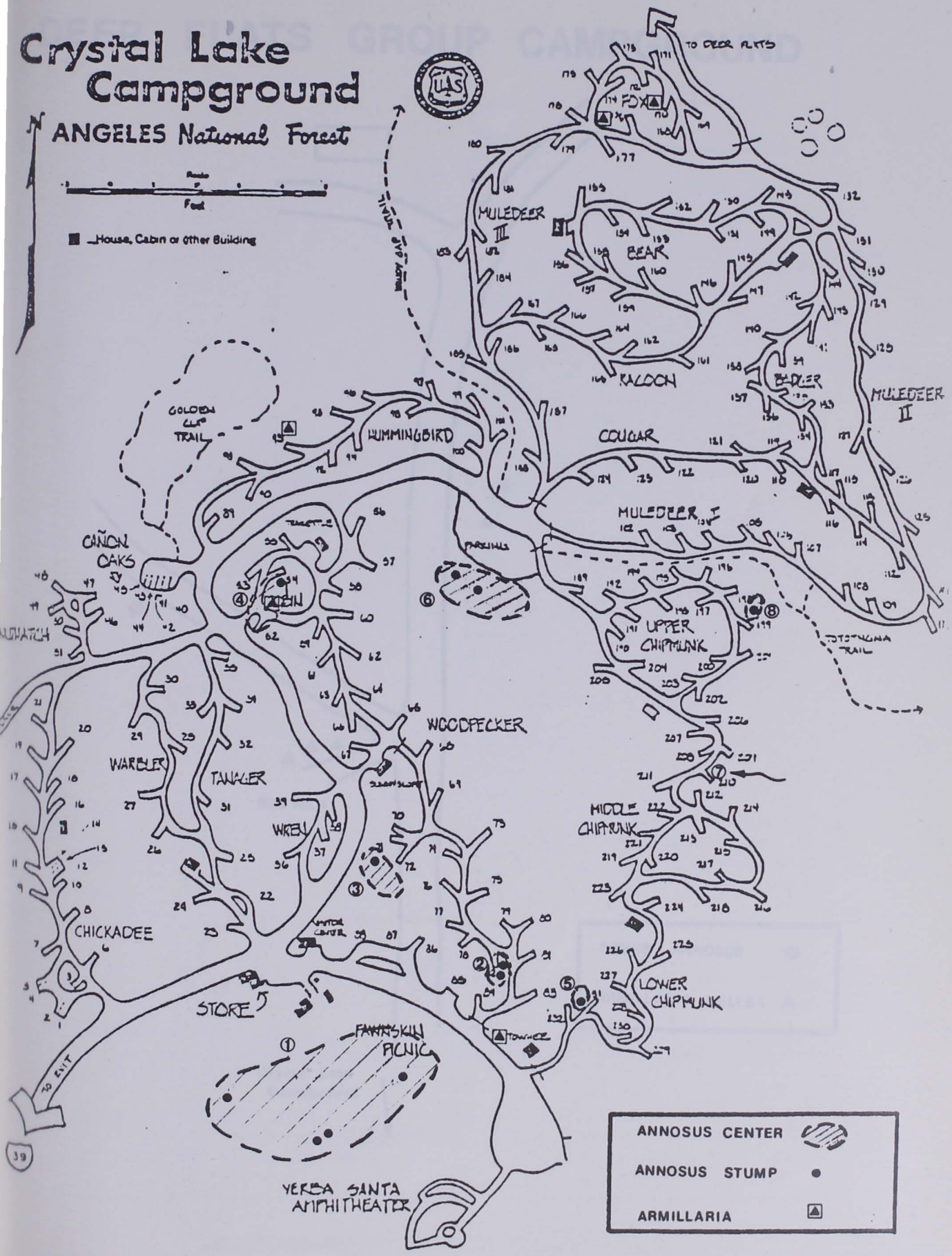
3. Stump and root removal. District personnel inquired as to the efficacy of removing easily accessible infected stumps from the ground. Removal of as much infected material as possible will help disrupt the underground network for fungal spread and establish a barrier to further spread. After the fine roots that remain in the soil have completely decomposed, the site will be suitable for conifer regeneration. Recently cut stumps can probably be removed by pulling. Partially decomposed stumps could be removed by excavation with a backhoe or by hand.

Although removal of infected material from the ground may be effective in reducing the amount of time before conifers can again be planted on the site, its efficacy has not been tested under southern California conditons.

4. Thin and interplant. Thinning of dense stands of susceptible conifer species and interplanting with resistant hardwood species will minimize opportunities for root contact and subsequent spread. Sparse stands or stands of mixed susceptible and resistant trees will be less subject to

damage. Thinning will also increase tree vigor and thus reduce the risk of damaging activity by bark beetles. Stumps created during thinning must be treated with borax and slash should be treated to minimize pine engraver buildups.

Although this evaluation concerns primarily Fomes annosus, previous evaluations have discussed other pest problems present in the Crystal Lake Recreation Area. In campground and recreation management planning, interactions among all insect and disease problems present should be considered. Technical advice and assistance are available from the FPM Staff.


Crystal Lake Campground
ANGELES National Forest
House, Cabin or other Building
TO DEER FLATS
FOX
MULEDEER III
BEAR
RALOOCH
BUDLER
MULEDEER II
MULEDEER I
COUGAR
HUMMINGBIRD
GOLDEN TRAIL
CAÑON OAKS
CABIN
UPPER CHIPMUNK
MIDDLE CHIPMUNK
LOWER CHIPMUNK
WOODPECKER
WARBLER
TANAGER
WREN
CHICKADEE
STORE
FAWNSKIN PICNIC
YERKA SANTA AMPHITHEATER
TOWNSEND
PARKING
TRAILHEAD
WATER CENTER
TO EXIT
ANNOSUS CENTER
ANNOSUS STUMP
ARMILLARIA

DEER FLATS GROUP CAMPGROUND